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Water Pollution
Survey

THE

ONTARIO WATER RESOURCES

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WATER POLLUTION SURVEY

of the

POLICE VILLAGE OF ORLEANS & VICINITY

TOWNSHIP OF GLOUCESTER

1969

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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF ORLEANS AND VICINITY

TOWNSHIP OF GLOUCESTER

IN THE

MUNICIPALITY OF OTTAWA-CARLETON

1969

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF ORLEANS AND VICINITY

TOWNSHIP OF GLOUCESTER

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MAP OF THE POLICE VILLAGE OF ORLEANS AND VICINITY

ONTARIO WATER RESOURCES COMMISSION
REPORT

INTRODUCTION

A water pollution survey of the Police Village of Orleans and vicinity was performed in October, 1968. Surveys of this type are made by the Ontario Water Resources Commission for the purpose of locating and recording sources of existing and potential water pollution. Samples were collected from Bilberry Creek as well as drainage ditches to this creek. Recommendations pertaining to the abatement of sources of pollution are made.

It is noted that the comments in this report pertain to conditions as they existed at the time of the survey.

The appendices to this report include an interpretation of the various tests performed on the samples, a summary of methods of financing water and sewage works programmes, a tabulation of the sample results and a map of the village showing the sampling point locations. A section has also been included on effective community planning through an official plan.

INTERVIEWS WITH OFFICIALS

Valuable assistance was received from the following officials during this survey:

Mr. F. D. Meldrum, Clerk,
Mr. P. D. Barton, C.P.H.I., Carleton County Health Unit,
Mr. A. Begin, Water Works Operator.

POLICE VILLAGE OF ORLEANS

The Police Village of Orleans is located approximately 5 miles east of the former limits of the City of Ottawa, south of the Trans-Canada Highway along the Carleton-Russel County boundary. The 1969 Municipal Directory indicates that the population of the police village is 1,510. The Village and surrounding area is drained by a branch of Bilberry Creek which flows in a northerly direction to the Ottawa River. Approximately 500 acres are within the limits of the police village.

WATER USES

Municipal

A new water supply and distribution system serving the Police Village of Orleans and surrounding area was placed in operation in the fall of 1967. Two drilled wells supply the water to a ground reservoir, from which it is pumped to the distribution system. Chlorination is the only treatment provided. The two deep wells have a capacity of 150 gpm and 80 gpm, respectively for a total of 330,000 gallons daily. During 1968 the average daily consumption was 59,300 gallons.

SURFACE WATER DRAINAGE

All surface waters drain to roadside ditches which eventually discharge to Bilberry Creek. Bilberry Creek discharges to the Ottawa River approximately 1.5 miles north of Orleans.

SEWAGE DISPOSAL FACILITIES

In the absence of a municipal sewage works, most of the premises are served by private sub-surface disposal systems. A large number of these systems were malfunctioning and discharging directly to roadside ditches and thence to Bilberry Creek and in turn adversely affecting the quality of the creek. This condition presents not only a potential health hazard but also is unsightly and causes offensive odours. The problem is created in part, by the limited areas of some building lots as well as the poor absorption characteristics of the soil. The Wendover soils in the area are composed of layers of clay which do not permit adequate drainage for sub-surface systems.

The St. Louis Dairy located on the north side of Highway 17 adjacent to Orleans employs a septic tank for the disposal of dairy wastes. The septic tank overflows to the surface and these wastes have access to West Bilberry Creek via a ditch. A connection to a communal sewerage system is one solution to this dairy waste problem.

In order to rectify the existing inadequate private disposal systems and also to adequately accommodate future growth, it will be necessary to develop a communal sewage collection and disposal system. As a 0.8 million gallon per day primary treatment plant is presently being constructed near the mouth of Bilberry Creek to serve development in the Township

of Cumberland, this plant should also be utilized to treat the sewage wastes from Orleans. A sewage collection system with a trunk sewer to the plant would be required as well as perhaps an increase in capacity at the new plant.

The municipal officials of the Township of Gloucester have made an application to the Ontario Water Resources Commission for an O.W.R.C.-municipal sewage system with discharge to the Bilberry Creek Plant.

SAMPLING PROCEDURE

The locations of sampling points are shown on the appended map of the Police Village of Orleans and vicinity. Samples were collected at pertinent points in order to assess the strength of wastes entering watercourses and their influence on the receiving streams.

Laboratory analyses were performed at the Ontario Water Resources Commission Laboratory in Toronto and the Ontario Department of Health Regional Laboratory in Ottawa.

SAMPLE RESULTS

The practice of discharging wastes from homes to roadside ditches on Cousineau, Dupuis, St. Jean and St. Charles streets as well as St. Joseph Boulevard are reflected in the laboratory analyses results for sample point No. BYE 1.6D and also in the sample results from East Bilberry Creek. A similar condition prevailed on St. Joseph Boulevard in the vicinity of Boyer Road and Notre Dame Street. Sample results

also, confirm the presence of sanitary sewage in the Hiawatha Road ditch, which empties into West Bilberry Creek near the municipal water works, and the adverse effects of these wastes are reflected in the creek sample results.

A sewer, although dry at this time, that serves a piggery building located in the vicinity of West Bilberry Creek near old Higheay # 17 may be contributing to the deterioration of the stream as noted in the pertinent sample analyses results.

The sample results, in general, confirm the readily apparent practice of sanitary waste discharge to roadside ditches and the resultant adverse affects this condition exerts on the receiving stream.

SUMMARY

A water pollution survey conducted in the fall of 1968 in the Police Village of Orleans revealed the presence of untreated or inadequately treated sanitary sewage in many of the drainage ditches and the adverse effects of these wastes on the water quality of Bilberry Creek. The soil conditions prevalent in the area have not lent themselves to the satisfactory subsurface disposal of wastes. The general increase in water consumption following the provision of a communal water supply in 1967 coupled with the above-mentioned soil conditions has increased the load on the individual sewage disposal systems.

A communal sewer system to serve the Police Village of Orleans and the St. Louis Dairy is urgently required. These waste flows should be collected and directed to the new Bilberry Creek plant for treatment.

The Gloucester Township officials have applied to OWRC for the construction of a sewerage system that would connect to the new Bilberry Creek Plant.

RECOMMENDATIONS

Every effort should be made by the municipal officials to provide a communal sewerage system to serve the Police Village of Orleans and the St. Louis Dairy, and to pursue the matter of a connection to the new Bilberry Creek sewage treatment plant which is being constructed to serve the Township of Cumberland.

Prepared by: .....
L.E.Murray, Engineering Technologist,
Division of Sanitary Engineering.

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TABLE I

APPENDIX

Significance of Laboratory Analyses

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objective for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Number (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million (ppm) is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses with regard to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, despositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and the results are reported in "turbidity units".

Physical Determinations

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen in water is replaced by oxygen from the

atmosphere, There is a saturation value for each temperature. At 18° C this is 9.54 ppm of dissolved oxygen. Values below the saturation level indicate the presence of pollution organic substances which are absorbing oxygen from the water. The extent of this deficiency is one index of the degree of organic pollution. Substantial reduction in dissolved oxygen causes suffocation of fish.

Temperature

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

TABLE II

APPENDIX

Nitrogen

Ammonia Nitrogen (Free Ammonia) is the soluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia and organic nitrogen determinations are important in determing the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation product of ammonia. The significance of nitrites, therefore, varies with their amount, source and relation to other constituents of the sample, notably the relative magnitude of ammonia and nitrate present. Since nitrite is rapidly and

easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide. Low, less than 0.1 ppm; moderate, 0.1 to 1.0 ppm; high, greater than 1.0 ppm.

Phosphorus

Total Phosphorus

Total phosphorus is a measure of both the organic and inorganic forms of phosphorus present.

Soluble Phosphorus is a measure of the orthophosphate only and when subtracted from the total phosphorus gives an indication of the concentration of organic phosphorus present. That is, the soluble phosphorus is a measure in the form of polyphosphate, which, however, in surface waters is

usually insignificant. Inorganic phosphorus in concentration in excess of 0.01 ppm may cause nuisance conditions.

Anionic Detergents (ABS)

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed 20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

   As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALLY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

APPENDIX

COMMUNITY PLANNING

The need for effective planning has become more important today than ever before. Municipalities are being burdened with the rising costs of land and labour. Therefore, any project a community hopes to develop should be based on sound planning. Planning at all levels of government is essential but, community planning can be most effective if interest and initiative is generated at the local level. The enormous benefits accrued as a result of good planning can more than compensate for the initial investment.

Community planning can be described as an effort to control and direct development effectively. This can best be achieved through the development of an official plan. An official plan is the stated intention of the local authorities with respect to orderly development within the planning area, that is prepared and set forth with professional assistance and meets the requirements as set out by the Provincial Planning Act. An official plan can be a joint effort by a number of municipalities which have common basic characteristics and common problems, or one municipality can establish a plan on its own initiative.

Orderly development yields future economy in services. Development in the community can be retarded where an official plan does not exist. A plan provides, among other things, the framework for the rational design of water and sewage works and also the extensions of mains and collector sewer systems.

A local council having decided to proceed with a programme of community planning definitely should contact the Ontario Department of Municipal Affairs. Through its many branches, information and guidance is provided to all interested parties.

POLICE VILLAGE OF ORLEANS AND VICINITY

SAMPLING POINT NO.	DATE 1968	LOCATION	FAECAL COLIFORMS	TOTAL COLIFORMS	5-DAY BOD	SOLIDS			NITROGEN AS N				PHOSPHORUS AS PO_4	ANIONIC DETERGENTS AS ABS
						TOTAL	SUSP.	DISS.	FREE AMMONIA	TOTAL KJELDAHL	NITRITE	NITRATE		
BY 0.1	SEPT.26	BILBERRY CREEK NEAR MOUTH		4,300	2.4	676	20	656	1.6	3.0	0.552	0.80	5.5	0.1
BYE 1.3D	OCT. 8	DITCH UNDER HWY. 17 WEST AT EAST BRANCH OF BILBERRY CR.	4,000	7,000	6.0	1296	65	1231	13	14	0.19	0.37	15	1.5
BYE 1.6D	OCT. 8	DITCH UNDER ST. CHARLES ST. WEST OF ST. JEAN ST.	800,000	6,100,000	21	1294	35	1259	11	14	0.010	0.01	23	6.3
BYE 1.3	SEPT.26	BILBERRY CREEK EAST BRANCH		1,100	2.4	682	21	661	0.39	1.44	0.254	0.90	3.4	0.1
		AT HWY.17(NORTH ROUTE)	1,900	1,900	2.8	858	52	781	3.5	5.1	0.373	4.6	5.0	0.7
BYE 1.9	OCT. 8	BILBERRY CREEK AT ST. JOSEPH ST. EAST OF BELCOURT BLVD.	500	3,800	2.4	550	31	519	3.5	4.4	0.050	0.22	3.4	0.3
BYW 1.65D	OCT. 8	DITCH UNDER ST. JOSEPH ST. WEST OF COUSINEAU ST.	41,000	104,000	20	948	20	928	9.0	10	0.080	0.44	11	1.2
BYW 1.7D	OCT. 8	DITCH UNDER ST. JOSEPH ST. EAST OF BOYER ST.	180	2,300	8.0	1,014	22	992	5.0	7.1	0.385	1.20	12	0.5
BYW 1.8D	OCT. 8	DITCH UNDER ST. JOSEPH ST. WEST OF BOYER ST.	32,000	2,100,000	20.0	1,032	29	1,003	5.5	7.5	0.080	0.21	17	5.0
BYW 1.85D	OCT. 8	DITCH CROSSING NOTRE DAME ST. WEST OF BOYER ST.	7,300	370,000	11	892	45	847	6.1	7.4	0.094	0.24	19	6.0
BYW 1.87D	OCT. 8	DITCH ON WEST SIDE OF BOYER ST. SOUTH OF NOTRE DAME ST.	16,000	5,800,000	20	968	89	879	5.6	7.0	0.107	0.41	23	1000
BYW 1.88D	OCT. 8	DITCH ON EAST SIDE OF BOYER ST. SOUTH OF NOTRE DAME ST.	13,200	440,000	11	950	79	871	7.4	9.0	0.29	0.23	17	530

POLICE VILLAGE OF ORLEANS AND VICINITY

SAMPLING POINT NO.	DATE 1968	LOCATION	FAECAL COLIFORMS	TOTAL COLIFORMS	5-DAY BOD	SOLIDS			NITROGEN AS N				PHOSPHORUS AS PO_4	ANIONIC DETERGENTS AS ABS
						TOTAL	SUSP.	DISS.	FREE AMMONIA	TOTAL KJELDAHL	NITRITE	NITRATE		
BYW 1.3D	OCT. 8	DITCH UNDER HWY. 17 AT NORTHWEST LIMIT OF VILLAGE		2,300	3.8	1034	45	989	5.5	6.3	0.175	0.83	12	0.3
BYW 1.9D	OCT. 8	DITCH UNDER OLD HWY. 17 BETWEEN HIAWATHA RD. AND THE VILLAGE	320	950	4.8	1066	15	1051	2.0	3.5	0.134	0.65	3.6	11
BYW 1.5	SEPT.26	WEST BILBERRY CREEK AT HIAWATHA RD. AND HWY.17		700	7.0	554	63	491	3.0	5.3	0.378	0.54	3.7	0
	OCT. 8	(NORTH ROUTE)	5,100	26,000	6.8	492	57	435	7.0	8.6	0.070	0.24	1.8	0.1
BYW 1.6D	SEPT.26	DITCH ON HIAWATHA PARK RD. TO BILBERRY CREEK AT ORLEANS W.W.		350	3.6	1442	683	759	3.2	3.5	0.167	0.09	2.9	0.1
BYW 1.6	SEPT. 26	BILBERRY CREEK ON SOUTH SIDE OF ORLEANS W.W. PUMPHOUSE		470	14	502	61	441	12	14	0.020	0.00	3.8	0.3
BYW 2.0	OCT. 8	WEST BILBERRY CREEK DOWN-STREAM FROM PIGGERY FARM	8,800	87,000	3.6	352	14	338	2.0	2.90	0.045	0.67	0.95	0
BYW 2.2	OCT. 8	WEST BILBERRY CREEK AT OLD HWY. 17	500	5,300	2.0	324	6	318	1.0	1.48	0.015	0.38	0.78	0

OTTAWA RIVER

BY O.1

BILBERRY CREEK SEWAGE TREATMENT PLANT

BILBERRY CR.

CUMBERLAND TRUNK SEWER

HIAWATHA PARK

HIAWATHA PARK ROAD

ST LOUIS DAIRY

ORLEANS WATER WORKS

BYW1.3 D

BYE1.3 D

BYE1.3

BYW1.5

BYW1.6 D

BYW1.6

BYW1.7 D

BYW1.8 D

BYW1.9 D

BYW1.65 D

BYW1.85 D

BYW1.87 D

BYW1.88 D

BYW2.2

BYW2.0

BYE1.6 D

BYE1.9

VILLAGE LIMIT

TRANS CANADA HIGHWAY (No. 17)

GREEN BELT

JEAN ST.

COUSINEAU ST.

CHARLES ST.

DUPUIS ST.

JOSEPH ST.

PIERRE ST.

BLVD.

ROCQUE ST.

MAISONEUVE ST.

ST. GABRIEL ST.

CHAMPLAIN ST.

PASTEUR ST.

NOTRE DAME ST.

ARTHUR ST. EAST

BILBERRY CR.

WEST BILBERRY CR.

BOYER ROAD

BELCOURT BLVD

DUMAS ST.

BENOIT ST.

LEBLOND ST.

CLAUDE ST.

THIRD LINE ROAD

TOWNSHIP OF GLOUCESTER

TOWNSHIP OF CUMBERLAND

LEGEND

BYW1.7 — SAMPLING POINT SHOWING STREAM AND MILEAGE

BYE1.6 D — STREAM AND MILEAGE AT OUTFALL, TYPE OF OUTFALL

OUTFALL SYMBOL LETTERS

--- D DITCH

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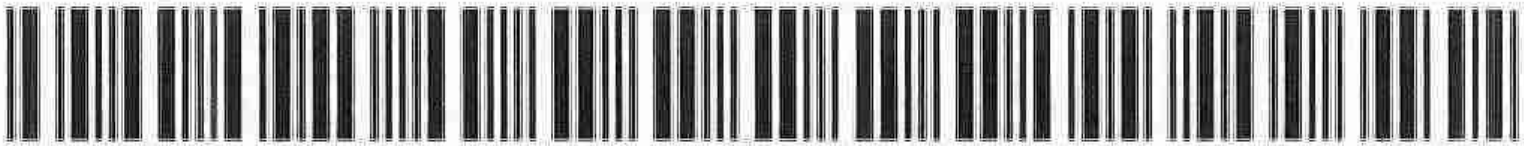
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